to a general practitioner, since the condition of the eyes may oftentimes be the only objective symptom which will enable him to arrive at a rational and scientific diagnosis. In fact, such considerations as we have briefly and, consequently, but imperfectly given in the foregoing pages, bring us back to the time-honoured maxim, "Qui bene distinguit, bene medibitur."

156 MADISON AVENUE, New York City.

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## ARTICLE XIII.

## ON ECHINOCOCCUS DISEASE IN AMERICA.

By WILLIAM OSLER, M.D., M.R.C.P. Lond.; Professor of the Institutes of Medicine, McGill University; Lecturer on Helminthology, Montreal Veterinary College; Physician to the Montreal General Hospital.

THE accidental ingestion of the eggs of the tiny *Tænia echinococcus* of the dog produces the most serious and fatal parasitic disease of man. The affection prevails extensively in certain countries, as Iceland and Australia, where the habits of the people or the relations of the canine host to man insure easy means of communication. In Europe the disease is not uncommon, and at any one of the larger clinics several examples are sure to occur during the session. So far as I know, the facts of its occurrence in America have not been investigated, and the object of this paper is to give an account of an inquiry into its prevalence. I was led to make this in connection with an annual course of lectures on the parasites of man and the domestic animals which I give to medical and veterinary students. I could not ascertain, from any writings at my command, whether the disease was common on this continent or not. In this section of the country it is rarely met with, and in the inspection of over 800 bodies only three instances have been found.

The following cases, 61 in number, have been collected from the museums, journals, transactions, and from private sources. The first three cases came under my own observation.

CASE 1. Single cyst in liver. The specimen was found in a subject provided for the class in operative surgery during the summer session of McGill Medical Faculty, in 1877. The man had been a tramp, and died in the hospital of pneumonia. No information could be obtained from him as to his nationality or past history. The cyst was the size of a large orange, and occupied the posterior part of the right lobe, in close contact with the diaphragm. These were daughter and granddaughter cyst, and the scolices were well developed. *Montreal General Hospital Reports*, vol. i. 1880, p. 314.

CASE 2. Cysts in liver, spleen, stomach, omentum, mesentery, and pelvis. An Italian, aged about 35, a resident of the city for four years. Died in the Hôtel Dieu on May 1st, 1880, after an illness of about six months. The chief

symptoms were enlargement of liver and spleen, with nodular tumours in abdomen, irregular fever, sweats, and emaciation. Autopsy revealed the following: Liver enlarged and closely matted to the stomach and omentum. Spleen projected beyond the costal border and reached nearly to the crest of the ilium. Attached to the root of the mesentery by a narrow pedicle was a large pear-shaped cyst the size of the fist. Omentum contained several small ones and the parietal peritoneum five or six, one much flattened and with four subdivisions. A large cyst, the size of a cocoa-nut, filled the entire pelvis and pushed up the bladder to a level with the navel and compressed it against the anterior abdominal wall. The liver was greatly enlarged but retained its shape; the under surface and anterior edge were closely united to the stomach and colon. The left lobe was as large as the right and contained two cysts, one in the anterior and the other in the posterior part; both contained pus and shreds of echinococcus membrane. The anterior cyst had perforated the stomach in two places and the duodenum in one; the orifices having smooth firm edges. There was a large cyst at the fundus of the stomach, completely within the wall and covered by a very thin mucosa. The spleen presented three small vesicles at the hilus, and contained a single cyst the size of a cocoa-nut everywhere inclosed by spleen tissue. (Unpublished.)

CASE 3. Obsolete cyst in liver. Englishwoman, aged about 40; dead of pneumonia. Hooklets in the cretaceous débris. (Unpublished.)

CASE 4. Cyst in liver. No history. Specimen, with those from Cases 1, 2, and 3 in the Museum of the McGill Medical School. (Unpublished.)

CASE 5. Cyst in liver. An Icelandic emigrant woman, patient of Dr. Buchan, of Toronto. Cured by a single aspiration. Scolices in the fluid. (Unpublished.)

CASE 6. Cysts in liver and pelvis. Dissecting room subject; female; Toronto School of Medicine. Two cysts in the liver, one of which had ruptured into the intestine. A third was attached to the walls of the pelvis. (Unpublished. Dr. I. H. Cameron.)

CASE 7. Cyst of liver. Young Englishwoman, patient of Dr. Cameron, of Toronto, who also furnished the notes of 5 and 6. (Unpublished.)

CASE 8. Obsolete cyst of liver. Englishman; inmate of Kingston Insane Asylum for 17 years. *Canadian Journal of Med. Sciences*, Aug. 1882.

CASE 9. Suppurating cyst of liver, bursting into lung; cyst in spleen. Englishman, aged 29, resident of Canada for five years. Dr. Black, of Uxbridge, Ont. (Unpublished.)

CASE 10. Echinococci in brain. No. 566 Army Medical Museum, Washington.

CASE 11. Cyst in anterior edge of liver. From a mulatto. No. 651 Army Medical Museum, Washington.

CASE 12. Cysts in lung, spleen, and bladder. Pole, aged 40. Remarkable history. *New York Medical Record*, Sept. 25, 1880. Nos. 1342–43–44 Army Medical Museum.

CASE 13. Several cysts from liver. Jar labelled P. C. 46, vol. i. Museum of University of Pennsylvania, G. B. Wood Cabinet.

CASE 14. Hydatid cyst of spleen. Same collection.

CASE 15. Liver with a cyst, probably hydatid. Same collection.

CASE 16. Cyst in abdominal wall. From an English sailor lad. Wistar-Horner collection, University of Pennsylvania. I did not see this specimen, but Prof. Leidy told me it was in the collection. He stated also that Nos. 13, 14, and 15 may not be American cases, as he was under the impression that the specimens had been imported from Paris by Dr. Wood.

CASE 17. Cyst in liver. Museum of the Pennsylvania Hospital, No. $1382^{50}$.

CASE 18. Multiple cysts in liver. From a French lad. Same collection, No. $1382^{55}$.

Case 19. Cyst of liver. From an Italian, aged 55. Same collection.

Case 20. Cyst in liver. New York Hospital Museum, No. 932.

Case 21. Multiple echinococci; one in abdominal wall, one on surface of liver, a third loose in peritoneal cavity, and a fourth in pelvis. No history. Same collection, Nos. 933–34–35–36–37.

Case 22. Single cyst in liver. Bellevue Hospital Museum, No. 865.

Case 23. Cysts in liver. Same collection, No. 866.

Case 24. Cyst of liver—suppurating. Same collection, No. 867.

Case 25. Large cyst of liver. Museum of University of New York (Prof. Loomis).

Case 26. Cyst in liver. Warren Anatomical Museum, Harvard, No. 2381.

Case 27. Echinococci discharged from intestine. Same collection, No. 3773.

Case 28. Cavity at apex of left lung containing echinococci. Same collection, No. 2156.

Case 29. Cyst in liver, from a sailor dead of phthisis. Same collection, No. 3871.

Case 30. Cyst in liver. Dr. Jacobi. *Transactions of New York Pathological Society*, vol. iii.

Case 31. Cysts in peritoneum, in gastro-splenic epiplöon, attached to spleen and liver, and one in the pelvis. Woman, æt. 29. Dr. Metcalfe. *Ibid.*

Case 32. Echinococcus of the common bile-duct. Old man, with enlarged liver and deeply jaundiced. Common duct blocked with a polypoid tumour the size of the thumb, which contained three echinococci. Dr. McCready. *Ibid.*

Case 33. Cyst of liver. Man, æt. 38. Dr. Loomis. Perhaps the specimen in museum of University of New York. *Ibid.*

Case 34. Cyst in region of liver. An Englishman, age not given. Passed four quarts of material containing echinococcus shreds; also vomiting some of them. Death from exhaustion. Dr. Keys. *Ibid.*

Case 35. Cyst of right lobe of liver. Woman, aged 29. Opened by caustic and incision. Death. Dr. Jacobi. *Ibid.*

Case 36. Two cysts in liver, right lobe. German, sailor. Dr. Cory. *Ibid.*

Case 37. Cyst of anterior border of right lobe. Dr. Finnel. *Ibid.*

Case 38. Cysts in liver. Opened by incision—recovery. Dr. Van Buren. *Ibid.*

Case 39. Cyst in liver. Opened by caustic and incision—recovery. Dr. Alonzo Clark. *Ibid.*

Case 40. Echinococci vomited. A woman, vomited at different times about a quart of echinococci, supposed to come from liver or omentum—recovery. Dr. Alonzo Clark. *Ibid.*

Case 41. Cyst in liver; held two quarts of turbid fluid; hooks found in the sediment. Dr. McCready. *Ibid.*

Case 42. Echinococci expectorated from the lungs. An Englishman, who had come from Honolulu. Dr. Bernays (Sen.), St. Louis, Mo. (Unpublished.)

Case 43. Cyst of liver, which burst into the bowel. German woman. Dr. Bernays (Sen.), St. Louis, Mo. (Unpublished.)

Case 44. Multilocular cyst of liver. A Bavarian, aged 39. Dr. Dean. *St. Louis Med. and Surg. Journal*, August, 1877.

Case 45. Multilocular cyst of liver, from a negro woman. Dr. Dean. *Ibid.*

Case 46. Cyst of liver. Man, aged 32. Dr. Tyson. *Trans. of Path. Society of Philadelphia*, vol. iv.

CASE 47. Echinococci of liver and pelvis. Frenchman, aged 32. Dr. Hutchinson. *Ibid.*

CASE 48. Tumour in right hypochondrium (liver) for several years. Expectoration of echinococci—recovery. Woman, aged 35. Dr. Minot. *Boston Med. and Surg. Journal*, vol. 61.

CASE 49. Echinococci passed per rectum. Woman, aged 29. Dr. Sherard (Mobile). *Med. and Surg. Reporter*, 1871.

CASE 50. Echinococci passed per rectum. Boy, aged 10. Abdominal tumour for some time. Symptoms of obstruction of the bowels. Recovery after the passage of a large number of echinococci. Dr. Simmons. *Pacific Med. and Surg. Journal*, 1864.

CASE 51. Cyst in gastro-hepatic omentum. Woman, in Bellevue Hospital. Symptoms—pain, jaundice, and peritonitis. Echinococcus cyst lay along the common duct and compressed it. Distension behind the site of pressure, and rupture of the duct. Dr. Polk. *Med. and Surg. Reporter*, vol. 42, 1880.

CASE 52. Echinococcus of brain. No history. Specimen in Cincinnati. Authority of Dr. Hyndman, Medical College of Ohio.

CASE 53. Cyst in liver. No history. Dr. Hyndman, of Cincinnati.

CASE 54.[1] Cyst in fascia of neck. Dr. Sands. *American Med. Times*, 1861.

CASE 55.[1] Echinococcus of lung. F. G. Smith. *North American Med.-Chir. Review*, 1858.

CASE 56.[1] Cyst in liver. J. E. Webber. *New York Med. Times*, 1853.

CASE 57. Cyst in tibia. F. W. Webster. *New England Journal of Med. and Surg.*, 1819.

CASE 58. Cysts in liver. E. Alexander. *Boston Med. and Surg. Journal*, 1838.

CASE 59. Cysts in liver; rupture into peritoneum. Man, aged 35. Dr. Gross. *Pathological Anatomy*, 2d edition, 1845, p. 662.

CASE 60. Cyst of liver.[2] Charity Hospital, New Orleans. Authority, Dr. H. V. Ogden.

CASE 61. Cyst in lung, cured by incision. Italian, aged 37. Dr. Fenger. *Am. Journal Med. Sciences*, Oct. 1881.

The distribution of the cysts throughout the organs of the body in this series of cases was as follows: Liver 44, spleen 4, peritoneum, omentum, and mesentery 7, pelvis 4, lung 5, brain 2, abdominal wall 2, stomach 1, bladder 1, subcutaneous 1, bones 1, in common bile-duct 1, discharged from intestines 5, vomited 2, expectorated 2.

This list, imperfect in many particulars, represents the available American cases of the disease. Doubtless there are many unrecorded instances; indeed, twelve or more of those here given have not been before published. It is evident that *echinococcus hominis* is a very rare affection in this country. Unfortunately we cannot say positively how many of these cases were truly American, *i. e.*, originated here, and how many were imported, but in sixteen it is stated that the patients were Europeans. In the majority the nationality was not given, but in all probability at least one-

[1] These three cases are quoted by Cobbold (Parasites, 1879), but Dr. Brigham, of the Boston Medical Library, could not confirm the references.

[2] I mislaid the notes kindly sent by Dr. Ogden, but, so far as I can remember, it occurred in a woman, a foreigner.

third of the cases were imported, leaving only about forty native cases. This immunity may be due either to scarcity of the adult worm or to the absence of conditions favourable to the infection of man. The *tænia echinococcus* is certainly a rare parasite. In some scores of dogs which I have examined during the past fifteen years I have never met with a specimen nor do I know of its detection by any American observer. Even in England, where the disease is tolerably common (some of the metropolitan museums have from twenty-five to thirty specimens of echinococci), Cobbold states that the only examples of this species that he knows of have been reared experimentally. That it is present in dogs in this country to a greater extent than we might suppose from the above facts is shown by the occurrence of echinococci in the lower animals. In casual visits to butcher stalls and to the shambles I have obtained six or eight large echinococci, and I have the liver of a cat with two large cysts. One of my students, Mr. A. W. Clements, of Lawrence, Mass., examined 270 hogs at the Montreal abattoir and found 10 animals affected.

I do not know of any systematic examination of a large number of animals, but Dr. Dean writes that a considerable proportion of the hogs slaughtered in St. Louis are infested, and Dr. Gross, in his "Pathological Anatomy," 1845, states that one-tenth of the hogs in Cincinnati were at that time affected, and speaks of "whole droves, consisting of three or four hundred animals, all of which were diseased in this way."

The conditions for the development of echinococcus disease in man are certainly present in the country, so far as the existence of the adult worm is concerned, and the immunity which the people enjoy may reasonably be attributed to the existence of sanitary arrangements which reduce to a minimum the risk of infection. Unlike the *tænia* and *trichina*, the echinococcus is not introduced with ordinary food but is probably always obtained by the drinking of water, accidentally contaminated with the feces of dog or wolf. A single ovum is sufficient to produce the most serious damage, as it possesses such capabilities of growth that a huge cyst may develop, containing daughter and granddaughter capsules, each of which has many thousands of scolices or so-called hydatid-heads. One would think that in the cattle and sheep ranches of the Western and Southwestern States the conditions were very similar to those in Australia where the affection is so prevalent. I am informed, however, that the use of dogs for herding purposes is much less common in this country, but there are probably other factors at work, as some Australian authorities state that the disease prevails in their cities quite as much as in the country.

I have to express my thanks to many persons who have kindly aided me in collecting the facts regarding the distribution of this affection; particularly to the curators of the museums in Washington, Philadelphia, New York, and Boston, to Dr. Billings for access to the MS. of the Sub-

jeet Catalogue of Library of Surgeon-General's Office, to Dr. N. S. Davis and Dr. Hatfield of Chicago, Dr. Inglis of Detroit, Drs. Alt and Dean of St. Louis, Dr. Hyndman of Cincinnati, Dr. Atkinson of Baltimore, Drs. Metcalfe and Sullivan of Kingston, Ont., Dr. I. H. Cameron of Toronto, and Dr. Henry Gibbons, Jr., of San Francisco.

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## ARTICLE XIV.

### A CASE OF ELEPHANTIASIS. By THOS. T. S. HARRISON, M.D., Selkirk, Ontario, Canada.

THE following case, which, with some hesitation, I have called "elephantiasis," is in some respects so unique, that I think it should be reported and preserved in some journal, the property of the great body of the profession.

John A., now nearly twenty-one years of age, of German parentage, first came under my notice some eighteen years ago. Father immigrated to this country when a mere child; mother, I think, was born here; they lived all their lives in a healthy rural district, farmers by occupation, perfectly healthy, and parents of a large family. The mother showed him to me, saying that one of his legs was too long. She said that at birth he was a large, well-formed, healthy child; that when about two years old he had the right foot slightly hurt, so as to make him limp; that as she knew, or thought she knew, the cause of his lameness, she made no special examination of the limbs until some four or five months after the injury, when she found the opposite leg, the left, to be considerably the longer. I was at this time away from home, and she had consulted a medical friend.

I found the boy was about three years of age, with the left leg an inch and a half or two inches longer than its fellow. The limbs were symmetrical as to the thighs; below the knee the right leg was normal in shape but looked small; the left was much longer, and had a peculiar loose, flabby appearance. There was no sign of a calf. The skin seemed to hang loosely, as if too large for the leg, which, larger than its fellow at the head of the tibia, increased in size to the malleoli, where the superabundant skin and cellular tissue hung over and covered a small and shapely ankle.

I was puzzled by the case, but finally concluded that there was an arrest of growth in the right leg, which had been injured so as to cause lameness ten or twelve months before, but as to the peculiar appearance of the left leg I could give no opinion. The mother told me that the medical men who had seen the case before me, gave her the same opinion that I had.

I saw the child occasionally on my visits to the neighbourhood, or when attending other members of the family; for, excepting the leg trouble, John was always healthy, and I gradually came to the conclusion that the right leg was normal, but that in the left there was not only increased growth of skin and areolar tissue, but that the tibia and fibula were enormously increasing in length.